

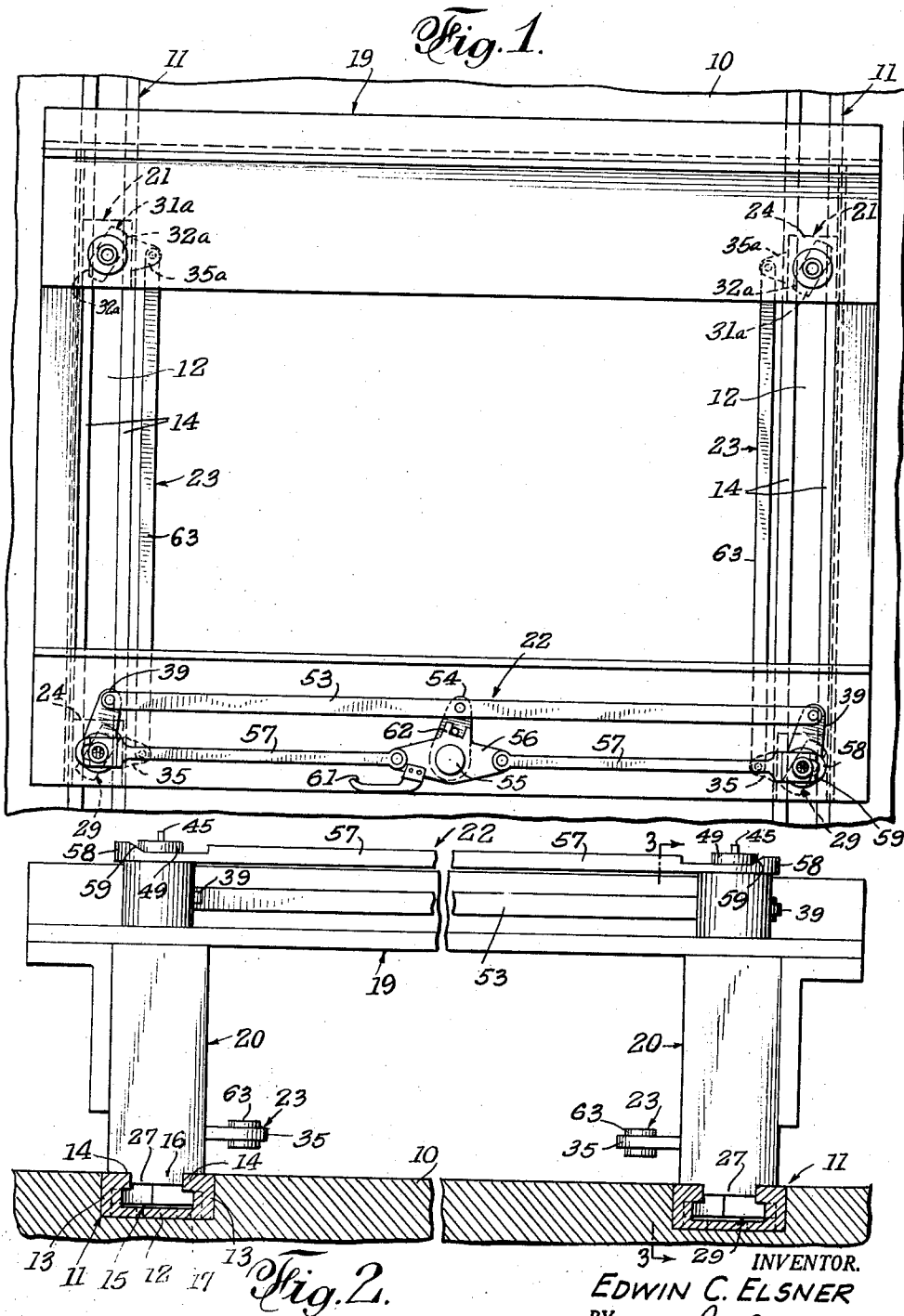
Aug. 11, 1959

E. C. ELSNER
RAIL-CONNECTED UNIT

2,899,167

Filed July 12, 1956

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 3.

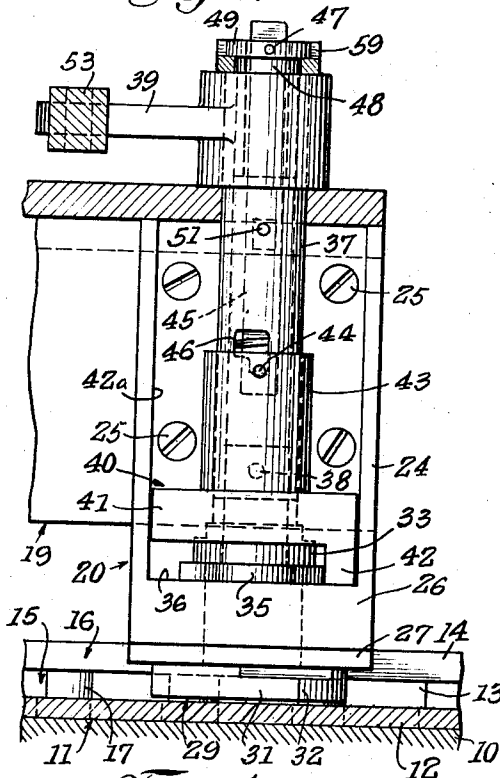


Fig. 4.

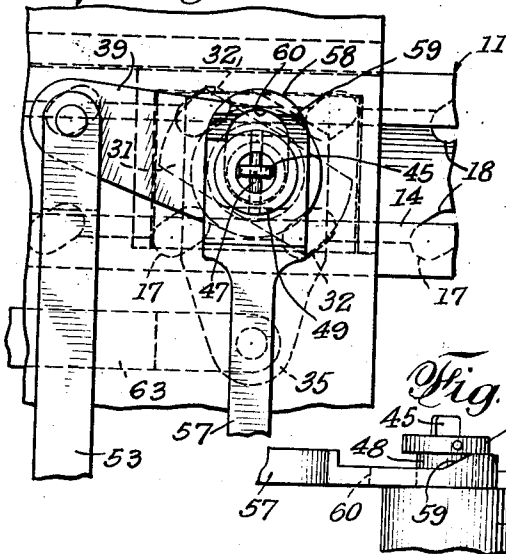


Fig. 5.

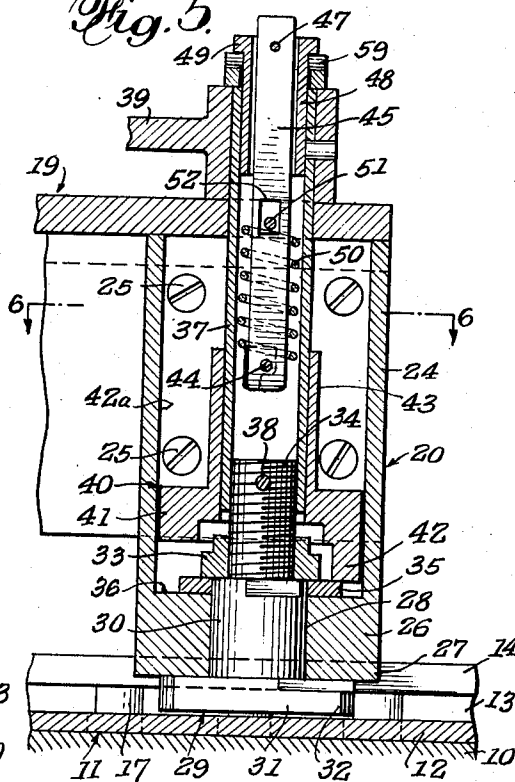


Fig. 6.

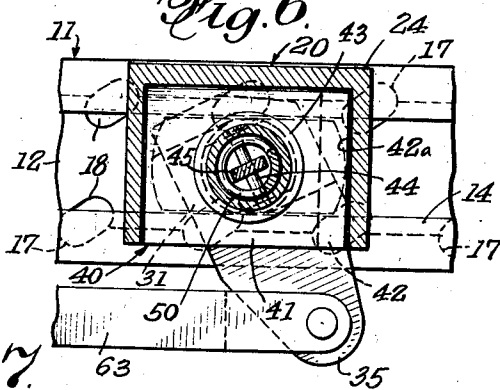
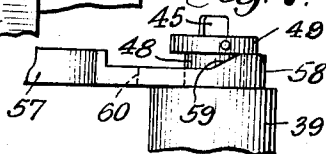


Fig. 7.



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RAIL-CONNECTED UNIT

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Application July 12, 1956, Serial No. 597,388

6 Claims. (Cl. 248—361)

This invention relates to a rail-connected unit, such as a seat, table, etc., and removably mounted on or anchored to a floor or deck. The present invention has many applications and is more particularly adapted for removably mounting passenger-accommodating seats in aircraft, as well as tables, partitions, etc. requiring a plurality of tie-down connections.

An object of the present invention is to provide a rail-connected unit that, by simple controls, may be connected to or disconnected from a floor or deck.

Since the forces in aircraft acting on a unit such as a seat may tend, at different times, to move such seat universally in all directions, it is essential that the removable anchor or connection of the seat and the floor or deck be firm and non-displaceable. Another object of the invention is to provide novel and improved means for simultaneously connecting to or removing from a rail-provided deck, an item such as a seat, and which requires two or more points of attachment for firm anchorage.

A still further object of the invention is to provide a unit having four anchor points and controlling the same simultaneously to connect or release such unit to or from a rail-provided deck.

A yet further object of the invention is to provide a turn-type of connection fitting for each anchor point of the unit and to provide facile means for operatively engaging a pair of rails having inturned flanges and fixedly disposed in parallel relation on a floor or deck.

The invention also has for its objects to provide such means that are positive in operation, convenient in use, easily installed in a working position and easily disconnected therefrom, economical of manufacture, relatively simple, and of general superiority and serviceability.

The invention also comprises novel details of construction and novel combinations and arrangements of parts, which will more fully appear in the course of the following description. However, the drawings merely show and the following description merely describes, one embodiment of the present invention, which is given by way of illustration or example only.

In the drawings, like reference characters designate similar parts in the several views.

Fig. 1 is a top plan view of a unit provided with four anchor points according to the present invention and shown in operative engagement with a rail-provided deck.

Fig. 2 is an enlarged and broken end view as seen from the bottom of Fig. 1.

Fig. 3 is a further enlarged vertical sectional view as taken on line 3—3 of Fig. 2.

Fig. 4 is a plan view of the parts shown in Fig. 3.

Fig. 5 is a vertical sectional view as taken on the vertical center of the unit shown in Fig. 3, the same being shown in position released from the anchor rail.

Fig. 6 is a plan sectional view as taken on line 6—6 of Fig. 5.

Fig. 7 is a similarly enlarged fragmentary side view of a detail of construction.

The drawing shows a floor or deck 10, the same being

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provided with a pair of similar rails 11 arranged in suitably spaced parallelism and preferably mounted on the deck to be flush, substantially in the manner shown. Each rail is formed to have a bottom web 12, side walls 13 extending from the side edges of the web, and inturned flanges 14 extending from the upper edges of said walls 13. Thus, each rail 11 comprises an elongated channel having a relatively wider longitudinal passage 15 between the walls 13 and a relatively narrower passage 16 between the flanges 14.

Each said rail is provided with a plurality of longitudinally spaced pairs of recesses 17 that are formed in the inner faces of the side walls 13. The recesses of each pair thereof are obliquely displaced, as may be seen from Figs. 4 and 6. While the recesses may be formed in various ways, the same are shown as resulting from milled slots 18 machined from the bottoms of said rails through the webs 12 thereof and for the height of the side walls 13. The milling does not extend into the flanges 14, as can be seen from Fig. 2. The slots 18 are shown as end-closed for greater strength but the same may be opened by being extended to the side edges of the rails.

According to the invention, a frame unit 19 may be connected to said rails 11 and, thereby, be anchored to the deck 10. The mentioned recesses 17 enable a selective location of said frame unit along the lengths of the rails, the side walls 13 of the rails obviate transverse displacement of the frame unit after such location by the recesses, and the flanges 14 obviate a lifting moment that firmly anchors the frame unit to the deck.

Said frame unit 19 is representative of any frame or structure having four anchor points and suitable to serve as the base of a seat, for instance. It is important only that the four anchor points be transversely spaced to conform with the center-to-center spacing of the rails, and it is preferred that two transverse points be arranged on a line normal to the rails. The other two points, while respectively aligned with each rail, need not necessarily be arranged along a line parallel to the line of the first two points, although the same is preferred and is here illustrated. The first two mentioned anchor points are represented by leg-like units 20 and the other anchor points are represented by units 21. Both pairs of units 20 and 21 anchor the frame 19 against both lateral and upward movement, while the units 20, additionally, locate the frame 19 longitudinally along the rails.

The units 20 are alike and are operatively connected by the means 22 to effect connection to or release from the rails 11. The units 21 are each connected by means 23 to one of the units 20 to be operated by the latter upon actuation of the means 22.

As best seen in Figs. 3, 4, 5 and 6, each unit 20 comprises a leg-like housing 24 that is fastened by screws 25 to the frame 19 and provided with a base part 26 that rests upon the rail flanges 14 and with a reduced portion 27 that slidably fits between said flanges. A vertical bore 28 is formed in said base part 26.

A fitting 29 is carried by said body, the same being provided with a stud 30 disposed in bore 28, and a fitting plate 31 that is somewhat thicker than the height of passage 15, and of a width to freely fit between the rail flanges 14. The length of said plate 31 is such as to fit between a pair of obliquely arranged recesses 17. The ends of plate 31 are curved so that when the plate is rotated around the axis of stud 30, the corners 32 of said plate will engage the recesses. By providing said corners 32 with reduced thickness (Fig. 3), said corners can be moved beneath flanges 14, as indicated in Figs. 1 and 4. Said plate is held against the reduced portion by a nut 33 that is engaged with a threaded shank 34 on the upper end of stud 30. An arm 35 is strung on said stud and keyed thereto to rotate with the stud and the plate 31,

the arm engaging the upper face 36 of the base part to hold the assembly against longitudinal displacement.

A sleeve 37 is secured to the shank 34 as by a pin 38, said sleeve extending upwardly through the top of the frame unit 19. The extending end of the sleeve is provided with an arm 39 and it will be clear that movement of said arm around the center or axis of stud 30 causes plate 31 to move between the mentioned position with its corners 32 beneath flanges 14, as in Figs. 3 and 4, and a position aligned in the passage 16 between said flanges, as in Figs. 5 and 6.

The above-described rotative movement of plate 31 is controlled by a member 40 which has a body 41 held against rotation by being fitted into recess 42a of housing 24 and overstanding the arm 35. A depending lug 42 on said body 41 may assume a position engaged with an edge of arm 35 to prevent rotative movement of said arm, as shown in Figs. 3 and 4. By shifting member 40 and its lug 42 upwardly and clear of arm 35, the latter may be moved, as in Figs. 5 and 6.

To this end, the body 41 is provided with an upwardly extending collar 43 that is connected by a cross pin 44 to a link 45 disposed longitudinally in sleeve 37 and extending upwardly from its connection 44 to the member 40. A suitably shaped opening 46 in sleeve 37 provides clearance for shifting movement of pin 44. The upper end of link 45 is connected by a cross pin 47 to a bushing 48 that is provided with an annular flange 49 that is disposed above the upper end of non-shifting sleeve 37. Said bushing centers on said sleeve and is vertically shiftable therein.

A spring 50, disposed within sleeve 37, normally depresses member 40 to the position shown in Fig. 3. The lower end of said spring abuts cross pin 44 and the upper end of the spring is abutted against a cross pin 51 located in tube 37 between pins 44 and 47. A slot 52 in link 45 allows shifting movement of the latter.

Since arm 35 is locked against rotative movement when member 40 is depressed as in Fig. 3, it will be clear that by upwardly pulling on bushing 48, lug 42 will be withdrawn from engagement with arm 35 to enable rotative movement of said arm, as in Figs. 5 and 6.

The means 22 is shown as comprising a link 53 that connects the arms 39 of both units 20 and which is connected to an operating arm 54 carried on a pivot 55 on frame unit 19 between units 20. Thus, rocking of arm 54 results in similar movement of arms 39.

Pivot 55 also carries a two-armed lever 56 and each arm thereof has pivotal connection with a link 57 that has a looped end 58 engaged with each respective bushing 48. As shown best in Figs. 4 and 7, the end 58 is interposed between arm 39 and bushing flange 49 and is provided with a cam portion 59 that, when the link 57 is shifted, acts on flange 49 to pull on spring 50 to raise lug 42 or release said spring to allow the same to lower said lug, according to the direction of shift of said link. A slot 60 in end 58 allows for such shift of link 57.

Arm 54 and lever 56 may be independently operated in desired sequence. However, it is preferred that the same be operated by a single control such as a handle 61 shown affixed to lever 56 and to provide a lost-motion connection 62 between said arm and lever in the general manner shown. Thus, when handle 61 is pulled, lever 56 moves first to exert a pull on links 57 and cause cams 59 to retract lugs 42 upwardly. Then, as said lugs clear arm 35, the lost-motion connection 62 causes coupling of said lever 56 with arm 54 to move the latter, moving link 53 to cause movement of arms 35. Thus, the first part of the movement of handle 61 unlocks or releases the arms 35 and the last part of the movement of said handle unlocks the plates 31 from connection with rails 23; reverse movement of said handle causes the reverse of the above—first, interlocking of members 39 and the rails, and then, locking of arms 35.

It will be clear from the above that units 20 may be firmly yet releasably locked to the parallel rails. Since the longitudinal spacing between the units 20 and units 21 may not conform to the spacing between the successive pairs of notches 17 of the rails, the plates 31a of units 21 will, ordinarily, be out of register with such notches. Therefore, the notch-engaging corners 32a of plates 31a are omitted, as indicated in the upper portion of Fig. 1.

The means 23 comprises a link 63 that connects each arm 35 and a similar arm 35a of each respective unit 21. Thus, the handle 61 not only locks and unlocks plates 31, but serves the same purpose for plates 31a. However, since said plates 31a cannot move except when plates 31 are moved, the member 40 and all parts relating to release shift of said member are omitted.

While the foregoing has illustrated and described what is now contemplated to be the best mode of carrying out my invention, the construction is, of course, subject to modification without departing from the spirit and scope of my invention. It is, therefore, not desired to restrict the invention to the particular form of construction illustrated and described, but to cover all modifications that may fall within the scope of the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In combination, a pair of parallel rails each having longitudinally spaced and obliquely opposed recesses and provided with inturned longitudinal and transversely spaced flanges, a unitary device provided with at least one pair of anchor units each unit of the pair being provided with a rail-engaging member operatively associated with each respective rail, means common to each unit of said pair to move the members thereof between a position partly beneath the rail flanges and engaged in said opposed recesses and a position aligned between the inturned flanges, means to releasably lock said members in the first-mentioned position, and means to actuate the same between locking and release positions.

2. In combination, a pair of parallel rails each having longitudinally spaced and obliquely opposed recesses and provided with inturned longitudinal and transversely spaced flanges, a unitary device provided with at least one pair of anchor units each unit of the pair being provided with a rail-engaging member operatively associated with each respective rail, means common to each unit of said pair to move the members thereof between a position partly beneath the rail flanges and engaged in said opposed recesses and a position aligned between the inturned flanges, means to releasably lock said members in the first-mentioned position, means to actuate the same between locking and release positions, and lost-motion means interconnecting the anchor units to operate the same sequentially.

3. In combination, a pair of parallel rails each having longitudinally spaced and obliquely opposed recesses and provided with inturned longitudinal and transversely spaced flanges, a unitary device provided with a pair of anchor units each unit of the pair being provided with a rail-engaging member operatively associated with each respective rail, means common to each unit of said pair to move the members thereof between a position partly beneath the rail flanges and engaged in said opposed recesses and a position aligned between the inturned flanges, said device being provided with a second pair of anchor units longitudinally spaced from the first pair and each unit of the second pair being provided with a rail-engaging member operatively associated with each respective rail, and a link connecting the rail-engaging members of each rail to move together between the mentioned positions.

4. In combination, a pair of parallel rails each having longitudinally spaced and obliquely opposed recesses and provided with inturned longitudinal and transversely

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spaced flanges, a unitary device provided with a pair of anchor units each unit of the pair being provided with a rail-engaging member operatively associated with each respective rail, means common to each unit of said pair to move the members thereof between a position partly beneath the rail flanges and engaged in said opposed recesses and a position aligned between the inturned flanges, said device being provided with a second pair of anchor units longitudinally spaced from the first pair and each unit of the second pair being provided with a rail-engaging member operatively associated with each respective rail, a link connecting the rail-engaging members of each rail to move together between the mentioned positions, and means to releasably lock the rail-engaging members of the first pair of anchor units in the rail-engaging position thereof.

5. In combination, a pair of parallel rails each having longitudinally spaced and obliquely opposed recesses and provided with inturned longitudinal and transversely spaced flanges, a unitary device provided with a pair of anchor units each unit of said pair being provided with a rail-engaging member operatively associated with each respective rail, means common to the units of each pair of anchor units to move the members thereof between a position partly beneath the rail flanges and engaged in said opposed recesses and a position aligned between the inturned flanges, said device being provided with a second pair of anchor units longitudinally spaced from the first pair and each unit of the second pair being provided with a rail-engaging member operatively associated with each respective rail, a link connecting the rail-engaging members of each rail to move together between the mentioned positions, means to releasably lock the rail-engaging members of the first pair of anchor units in

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the rail-engaging position thereof, and means to actuate the same between locking and releasing positions.

6. In combination, a pair of parallel rails each having longitudinally spaced and obliquely opposed recesses and provided with inturned longitudinal and transversely spaced flanges, a unitary device provided with a pair of anchor units each unit of the pair being provided with a rail-engaging member operatively associated with each respective rail, means common to each unit of said pair of anchor units to move the members thereof between a position partly beneath the rail flanges and engaged in said opposed recesses and a position aligned between the inturned flanges, said device being provided with a second pair of anchor units longitudinally spaced from the first pair and each unit of the second pair being provided with a rail-engaging member operatively associated with each respective rail, a link connecting the rail-engaging members of each rail to move together between the mentioned positions, means to releasably lock the rail-engaging members of the first pair of anchor units in the rail-engaging position thereof, means to actuate the same between locking and release positions, and lost-motion means interconnecting the anchor units to operate the same sequentially.

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